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CENTRAL INTELLIGENCE AGENCY

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INFORMATION REPORT

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SCR-584 COMPONENTS

1. I saw an American-built SCR-584 in 1948 or 1949. I never observed any which had been built in the USSR, but at a later date I saw a number of Soviet components at Branch No. 1 Plant 88 which were identical to, and could be used as parts for an SCR-584. They included cathode-ray tubes, usable as SCR-584 PPI, J, and A scopes. (I believe that these three types of scopes are used in the SCR-584.) They also included gas-filled diodes, used as trigger tubes, T-R tubes, 10-centimeter rectangular waveguide, and amplidynes. (I do not know whether a rectangular waveguide is used in the SCR-584, but I am certain that the waveguide I saw was dimensioned for a 10-centimeter wavelength. Also I am not sure whether the amplidynes were identical to the ones used in the SCR-584.) I never saw any 10-centimeter magnetrons, but saw them listed in tube lists. 50X1

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CONFERENCES

2. I attended two conferences in Moscow in December 1948 and January 1949. The conferences were sponsored by the Ministry for Armaments, to which NII 88 was responsible. They were held in one of the buildings of NII 88. The purpose of the conferences was to present the development work of the Branch No. 1 group. Actually no decisions were made at the conference; it was rather a lecture and question-and-answer session led by the Branch No. 1 personnel.

3. The conferences were attended by twenty to thirty persons in addition to the Germans. These persons represented the Armaments Ministry; the "competitor" of the Branch No. 1 group, KONOPLOV [redacted] 50X1 and at least one Moscow scientific institute, [redacted] 50X1 which was represented by a mathematician. Most of the conferees were not introduced, and it was impossible to determine the organization which they represented. The conference in January 1949 was the last one held in Moscow attended by Germans. Subsequent conferences were held on Gorodomlya Island, but the programs were generally the same as they had been in Moscow. I cannot remember any names of conferees in addition to the ones mentioned in previous reports. [redacted] 50X1

ROCKET DEVELOPMENTS 50X1-HUM

[redacted]

Warhead Weights

5. I am quite certain that the warhead weights of the three ground-to-ground rocket developments were to be the same, but I am not sure of the actual weight to be used. I believe that it was specified as one metric ton; here again TOEBE's information would be more accurate.

A-4 Modification

6. The required range for the modified A-4 development was between 300 and 400 kilometers.

Combustion Cut-Off Problems

7. The desired accuracies at combustion cut-off for both the 300 and 3000 kilometer rockets were plus or minus one-thousandth of the distance at cut-off for altitude and direction. Consideration was given to control of the velocity of the rocket prior to cut-off by ground control, using the "Alpha-Regler" in the rocket [redacted] 50X1 However, no serious work was done on this problem. The possibility of controlling velocity immediately after cut-off was discussed, but not developed to any great extent. This would involve the installation of electronic equipment in the separable warhead to monitor the velocity and control a small auxiliary rocket engine which might boost the velocity by approximately one per cent. No system of control of the warhead was planned for re-entry into the atmosphere. 50X1

[redacted] 50X1

Long-Range Rocket

8. The final report on this cone-shaped rocket project was presented to a conference in Moscow at the end of 1949. No Germans attended this meeting, and no information about decisions, questions or reaction by the conferees was given to the Germans. The power plant design for this rocket ran along two separate lines. One plan was to use four 15-atmosphere engines for a first stage and another 15-atmosphere "altitude" engine (with a longer nozzle) for the second stage. The second design was a single-stage rocket using a 60-atmosphere engine. 50X1-HUM [redacted] No external stabilizers were to be used on the cone-shaped rocket. For travel through the atmosphere the lower portion of the cone would act as stabilizer. Combustion cut-off was to occur at a distance of approximately 280 kilometers, which corresponded to an altitude of about 220 to 240 kilometers. The distance of 280 kilometers was arrived at as the optimum value for fuel consumption and required acceleration for the total range. Combustion cut-off, of course, represents the limit of control as steering is accomplished by deflection of the jet stream. The same 50-centimeter wavelength was to be used for the transmission of control signals, as was planned for the A-4 modification. However, it was impossible for the Germans to determine whether this wavelength would be seriously attenuated and/or refracted at the extremely high altitudes involved.

Long-Range Pilotless Aircraft

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9. This development originated at Branch No. 1, but the engine to be used by the aircraft was based on a wartime development of TROMMSDORF [redacted] At that time it was used as an auxiliary power plant to be incorporated in cannon projectiles to give them greater range. 50X1 The Soviets showed great interest in the hyperbolic navigation system developed for this aircraft. [redacted] The first report on the project included only an outline of the system, giving major characteristics, etc. The Soviets 50X1 requested additional details, and a second report was prepared with proposed block diagrams, estimates of amount of equipment required, and details on resistance to countermeasures. These included the following proposed items:

a. Use of a number of transmitters of which only two are selected for the actual navigational control.

b. Delay lines to produce a pulse delay in the transmitter, which would then be resolved in the aircraft by a preset coding arrangement.

c. Variation in pulse delay, causing aircraft to fly detours rather than a direct course.

d. Time gate circuits in the aircraft receiver to prevent pick-up of spurious pulses during intervals between desired pulses.

e. Polarization and directivity of the aircraft antenna.

The Soviets showed some, but not as much, interest in other phases of the aircraft project. Our group expected that the best attainable accuracy for the hyperbolic navigation system was 20 to 30 kilometers at a range of 3000 kilometers. However, the accuracy was very questionable as no actual experiments were performed. The main limiting factor would be the accuracy of the travel time ofthe radiated wave. The entire project was developed only on paper and hyperbolic charts and actual equipment were never prepared.

Antiaircraft Rocket 50X1

10. The "Hund auf der Kugel" principle was used as the basis for the guidance system involving two SCR-584s. [redacted] The project was developed for interception at 50X1 a maximum slant distance of 30 kilometers and a maximum altitude of either 20 or 30 kilometers. (I am not certain of the maximum altitude.) The minimum distance for interception was to be 3 to 4 kilometers, and the minimum angle above the horizontal was 15 degrees. The maximum velocity of the target to be intercepted was to be approximately Mach 1, and the rocket velocity Mach 4 to Mach 5. (I am not certain of the latter figures.) Some allowance was made in the development for maneuvering of the target, but I do not remember the extent of these maneuvers. It was planned to use a target seeker for the final three to four kilometers of the interception. This was not developed at all on Gorodomlya Island, however. Interception of an enemy ground-to-ground rocket was proposed by the Soviets but the Germans refused towork on such a project; they claimed such interception would be impossible due to the high velocity of the long-range missile.

BAHNMODELL EXPERIMENTS FOR STABILIZATION OF FIGHTER AIRCRAFT

11. In 1950 HOCH's group worked on a project assigned by Moscow to investigate stabilization of fighter aircraft by using the Markgraf gyro system. [redacted] The 50X1 Bahnmodell (path simulator) was used to carry out the investigation. I did not personally work on this project and do not know what coefficients were assigned to the Bahnmodell, or what fighter they represented. The system used produced both damping and static stability, i.e., the aircraft would always return to the initially set course. A simulated fighter control stick was used with a spring return to the neutral position. However, the signal applied to the gyro was proportional to the position of the stick rather than to the force exerted on it. The final result of the project was a report by HOCH. I do not know any of the data presented in this report.